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THE FATS AND OILS SITUATION

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CONSUMPTION OF DRYING OILS, UNITED STATES, AVERAGE 1934-36

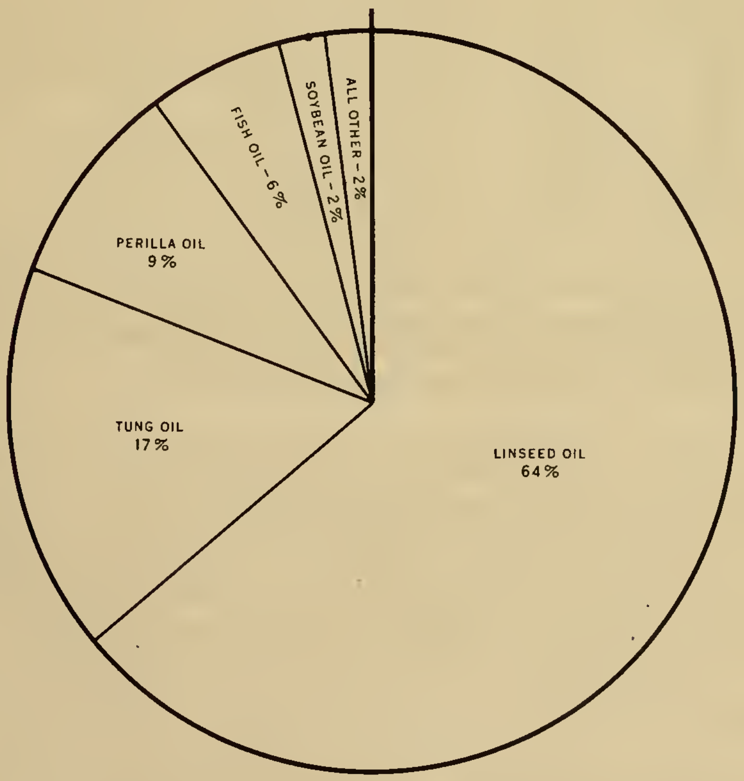

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Table 1.- Consumption of fats and oils in the drying industries in the United States, 1931-36

Calendar year	Linseed oil 1/	Tung oil 1/	Perilla oil 1/	Fish oil	Soybean oil	Other 2/	Total
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.
Average							
1931-33	400	89	16	23	12	4	544
1934-36	450	123	63	40	16	11	703
1931	471	90	11	27	9	3	611
1932	354	74	11	20	12	4	475
1933	376	102	25	22	14	5	544
1934	409	117	24	25	13	7	595
1935	465	129	60	43	18	8	723
1936	477	121	105	52	17	18	790
	As percentage						
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Average							
1931-33	73	17	3	4	3	3/	100
1934-36	64	17	9	6	2	2	100
1931	77	15	2	4	2	3/	100
1932	75	16	2	4	3	3/	100
1933	69	19	5	4	3	3/	100
1934	69	20	4	4	2	1	100
1935	65	18	8	6	2	1	100
1936	61	15	13	7	2	1	100

1/ Since drying oils are used directly as well as in factory consumption, these figures represent total domestic disappearance excluding small quantities reported by Bureau of the Census as used in soap, shortenings, and miscellaneous products.

2/ Includes factory consumption of castor and miscellaneous oils, in 1931-33. In 1934, 3,000,000 pounds each castor and sunflower oils, and 1,000,000 pounds miscellaneous oils. In 1935, 4,000,000 pounds castor oil, 2,000,000 pounds oiticica oil, and 2,000,000 pounds miscellaneous oils. In 1936, 5,000,000 pounds castor oil, 2,000,000 pounds oiticica oil, and 11,000,000 pounds miscellaneous oils, probably largely hempseed oil.

3/ Less than 1 percent.

Based on - Bureau of the Census, Factory Consumption of Primary Animal and Vegetable Fats and Oils, by classes of products, calendar years, 1931-36.

CONSUMPTION AND SUPPLIES OF DRYING OILS

Consumption of fats and oils by the drying industries has increased steadily from the low point of 475 million pounds in 1932 to 790 million pounds in 1936. Over these years the percentages contributed by tung and soybean oils have been approximately maintained while a decrease in the percentage of linseed oil has been balanced by increases of perilla, fish, and miscellaneous minor oils such as hempseed, castor, and oiticica oils. The levying of the 4-1/2 cents per pound excise taxes on perilla and hempseed oils and 2 cents per pound on the seeds, effective August 21, 1936 (See table 12), and the consequent decreased imports together with increasing demands for drying oils will undoubtedly lead to continued increased use of fish oils, tung oil, and all available substitutes. See table 1.

Estimated total consumption of drying oils amounted to about 204 million pounds in the first quarter of 1937 compared with about 156 million pounds in the same period in 1936. This increased consumption was shared by linseed, tung, and fish oils. About 4 million pounds more fish oils were consumed in the first quarter of 1937 than in the same period last year. Use of perilla and hempseed oils dropped sharply as was expected because of the excise taxes.

Net imports of flaxseed into the United States amounted to about 17 million bushels in the 9 months ending March 1937, compared with only about 11 million bushels for the same period in 1934-35, although production from the very short crops of 1934 and 1936 was approximately the same, that is, about 6 million bushels. See pp. 12-13 of FOS-2, April 1937, for flaxseed situation.

In the first 4 months of 1937, prices of most drying oils, except tung oil, were on a somewhat higher level than in the same period of 1936. They also were well above the annual average prices prevailing in 1935 and 1936. Fish oils especial have been 2 to 3 cents higher in price in recent months, as they are being utilized by the drying industries in increased amounts. The notable exception is tung oil which has declined in price since April 1936. The April 1937 price of 15.3 cents per pound was 3.9 cents below that of the preceding April, and was lower than the 1935 and 1936 annual average prices of 17.0 and 16.1 cents, respectively. The decline is attributed to the definitely increased supplies. See table 13.

Table 2.- Drying oils: Production, net imports, stocks, and apparent disappearance, by quarters, 1936, and 1st quarter of 1937

(Net exports are indicated by a minus sign)

Item	1936 1/				1937 1/
	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.
Linseed oil -					
Production 2/	132.1	100.1	91.1	131.9	156.9
Net imports	-0.2	0.3	-0.2	-0.2	-0.2
Stocks, end of period	187.5	140.7	98.4	117.3	137.5
Apparent disappearance	91.0	147.2	133.2	112.9	136.4
Tung oil -					
Production 3/					
Net imports	42.1	41.2	31.5	20.1	44.8
Stocks, end of period	35.6	38.5	44.8	28.9	35.2
Apparent disappearance	25.5	38.3	25.2	35.9	38.4
Perilla oil - 4/					
Production	0.8	0.1	0.5	0	0
Net imports	30.7	50.5	36.7	0	2.2
Stocks, end of period	23.8	33.7	38.8	19.8	10.2
Apparent disappearance	20.6	40.7	32.1	21.0	13.7
Hempseed oil -					
Production	6.4	4.8	1.4	5/	0
Net imports	0	6/	0	6/	0
Stocks, end of period	8.2	7.5	3.4	2.0	0.8
Apparent disappearance	6.4	5.6	5.6	1.3	1.3
Fish oils -					
Estimated disappearance for drying uses 7/	9.4	11.6	13.3	15.3	13.7
Soybean oil - 8/					
Estimated disappearance for drying uses	3.2	6.3	5.0	2.9	1.8
Oiticica oil -					
Net imports	0	0	1.5	0.5	1.0
Total -					
Estimated disappearance	156.1	249.6	215.8	187.9	204.3

1/ Preliminary. 2/ From domestic and imported material.
3/ Production from domestically grown nuts is reported with "other oils".
4/ Production is oil equivalent of imported seed. Apparent disappearance for fourth quarter of 1936 and first quarter of 1937 is reported factory consumption. 5/ Not separately reported.
6/ Less than 500,000 pounds. 7/ 19.3 percent of total disappearance.
8/ Use in drying industry by quarters estimated on a percentage basis comparable to perilla oil.

Table 3.- Flaxseed: Production in specified countries, and estimated world total, average 1919-23, 1924-28, 1929-33, annual 1933-36

Country	5-year average			Annual			
	1919-23	1924-28	1929-33	1933	1934	1935 1/	1936 1/
	1,000 bu	1,000 bu	1,000 bu	1,000 bu	1,000 bu	1,000 bu	1,000 bu
North America -							
United States	10,572	23,275	13,553	6,904	5,661	14,520	5,908
Canada	5,946	6,085	2,455	632	910	1,667	1,795
Mexico 2/		3/ 90	3/ 50	71	65	69	
Europe and Asia -							
India 4/	15,941	17,853	16,664	17,600	16,080	17,920	16,168
U.S.S.R.	10,276	21,466	30,343	29,133	27,020		
Poland	1,199	2,359	2,173	1,774	2,179	2,793	2,820
China						2,400	3,200
Lithuania 5/	982	1,376	1,140	823	1,014	1,487	1,444
Germany				125	249	654	1,276
France	332	561	493	183	429	607	1,006
Belgium	487	463	385	272	337	430	773
Latvia 5/	501	823	595	485	597	811	725
Rumania	189	256	398	420	365	450	534
Estonia	300	404	314	244	290	369	440
Netherlands	322	379	268	138	190	273	394
Turkey			237	272	109	240	
Czechoslovakia	302	355	155	105	168	225	288
Hungary	3/ 53	44	209	202	251	210	221
Japan	6/ 346	184	119	147	181		
Italy	430	399	177	87	80	88	149
Bulgaria	4	3	8	8	14	46	75
Yugoslavia		34	46	39	33	36	
Africa - 7/							
Morocco	515	390	455	125	326	243	315
Tunisia	36	35	38	12	8		
Egypt	52	37	40	49	74	64	77
Eritrea				35	43	24	
New Zealand	140	61	74	25	34	23	
Other countries 8/	(238)	(216)	(141)	(113)	(139)	(143)	(111)
	1919-20 to 1922-23	1924-25 to 1928-29	1929-30 to 1932-34	1933-34	1934-35	1935-36	1936-37
South America - 9/							
Argentina	50,305	72,406	68,403	62,595	79,720	56,100	74,012
Uruguay	863	1,905	3,493	2,876	3,402	3,007	4,901
Estimated world total 8/	103,000	154,000	145,000	127,000	142,000	132,000	144,000
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.
Linseed oil equivalent 10/	1,895	2,838	2,672	2,356	2,624	2,441	2,665

Continued -

Table 3.- Flaxseed: Production in specified countries, and estimated world total, average 1919-23, 1924-28, 1929-33, annual 1933-36 - Continued

1/ Preliminary.

2/ Harvested in March, April, or May of year shown. Planted late in preceding year. (Mr. A.C. Dillman's office, B.P.I., May 3, 1937.)

3/ 4-year average.

4/ Harvested January - April of year shown. Planted August - November of preceding year. Exports are distributed over several months, heaviest exports being April - December. The 5-year average 1932-36, shows about 12 percent of the calendar year exports were shipped out in the 3 months January - March. (Broomhall's Corn Trade Yearbook, 1929, p. 20; Estimates of Area and Yield of Principal Crops in India, 1933-34, p. 54.) The data are reported estimates for British India and native states plus estimates by the Government for miscellaneous provinces not reporting, or about 5 percent.

5/ Flax and hemp.

6/ 3-year average.

7/ In Northern Africa, flaxseed planted in fall and winter is harvested March to June of the year shown. (International Review of Science and Practice of Agriculture, July - December, 1922, p. 1493; Tunisian Products, Direction of Agriculture, Commerce, and Colonization, 1908, p. 16-17; Egyptian Government Almanac, 1931, pp. 292-3; Notes on Egyptian Agriculture, U.S. Department of Agriculture Bulletin No. 62.)

8/ In computing the totals, arbitrary estimates have been interpolated for years where data are unavailable.

9/ Planting extends from May to September, depending on latitute and altitude. Harvest begins in October or November and may extend into February. (Annuario Agropecuario, 1932, p. 53; Paint, Oil, and Chemical Review, August 1935; North Dakota Agricultural Experiment Station Bulletin 253, December 1931, "Flax Production in Argentina", by H.L. Bolley; International Institute of Agriculture, Monthly Bulletins; Broomhall's Corn Trade Yearbook, 1929, p. 20.)

10/ Using 0.33 as oil yield factor.

Compiled from official sources and the International Institute of Agriculture.

Table 4.- Linseed oil and flaxseed in terms of oil: Net exports or net imports, by countries, 1931-36

(Net exports are indicated by a minus sign)

Country	1931		1932		1933		1934		1935 1/		1936 1/	
	Seed in terms of oil	Linseed oil	Seed in terms of oil	Linseed oil	Seed in terms of oil	Linseed oil	Seed in terms of oil	Linseed oil	Seed in terms of oil	Linseed oil	Seed in terms of oil	Linseed oil
	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.
EXPORTING SEED:												
Argentina	-1,368	-	-1,475	-	-1,013	-	-1,000	-	-1,293	-	-1,139	-
British India	-73	1	-46	1	-243	1	-197	1	-85	1	-227	-
Uruguay	-97	-	-57	-	-44	-	-52	-	-	-		
Other 2/	-31	2	-26	6	-22	8	-32	1	-26	1		
IMPORTING SEED; EXPORTING OIL:												
Netherlands	304	-160	325	-126	213	-105	232	-170	290	-191	237	-159
France	191	-3	171	-6	192	-8	172	-13	188	-26	204	-26
Belgium	115	-21	117	-33	89	-20	57	-7	86	-6	76	-5
Sweden	35	-2	32	-1	26	-	28	-	30	5	27	9
Japan	6	-	5	-1	16	-1	14	-1	16	-2		
IMPORTING SEED AND OIL:												
United States	268	-1	146	-1	255	10	262	2	325	1	284	-
Germany	247	1	324	29	260	23	230	26	180	24	159	42
United Kingdom	250	49	268	25	184	-9	136	43	190	65	202	21
Italy	45	6	50	4	55	2	47	1	52	2		
Norway	10	9	13	2	14	2	11	2	18	1	16	-
Denmark	14	2	18	1	14	-	12	-	19	-	15	-
Spain	15	-	17	-	12	-	12	-	18	-		
Australia	10	2	16	3	16	2	18	2	-	-		
Czechoslovakia	19	-	26	-	14	-	18	-	19	-2	18	-
Canada	-13	1	2	1	-9	2	14	10	11	1	21	3
Switzerland	-	19	-	20	-	17	-	16	-	18		
Austria	-	12	-	9	-	8	-	9	-	10	-	11
Br. So.Africa	-	6	-	4	-	6	-	7	-	8		
Other 3/	14	33	16	26	17	26	14	26	9	26		

Continued -

Table 4.- Linseed oil and flaxseed in terms of oil: Net exports or net imports, by countries, 1931-36 - Cont'd

1/ Preliminary

2/ Other includes Lithuania, Morocco, Rumania, U.S.S.R., Eritrea, and China.

3/ Other includes Poland, Yugoslavia, Latvia, Estonia, Finland, Brazil, Irish Free State, Philippine Islands, British Malaya, Egypt, Chosen, Chile, Bulgaria, Hungary, New Zealand, French Africa, and Netherland India.

Compiled from official sources.

Denmark, British East Africa (Zanzibar), Ceylon, French Oceania (New Caledonia and French Settlements in Oceania), Greece, and Portugese Africa (Mozambique, Portugese Guinea, Angola, and St. Tome and Principe) report some net imports of oil. Ceylon also reports small imports of seed, while British East Africa (Kenya and Uganda) reports small exports of seed. Union of South Africa, Northern and Southern Rhodesia report imports of oil; Union of South Africa also reports small imports of seed for 1931 and 1932.

Leaders indicate less than half a million pounds, or not separately reported.

Table 5.- Flaxseed and linseed oil: United States imports, by countries, 1926-36

Country of origin	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936 1/
	Flaxseed										
	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.	1,000 bu.
Argentina	19,443	19,366	14,941	23,121	11,526	13,260	7,205	11,383	8,592	16,151	13,167
British India	2/	-	-	59	-	2	-	2,037	4,221	934	1,294
Canada	3,043	2,411	2,599	1,063	915	1,214	467	431	330	72	530
Other 3/	64	44	39	2/	221	-	-	115	1,027	403	374
Total 4/	22,550	21,821	17,579	24,243	12,662	14,476	7,672	13,966	14,170	17,560	15,364
	Linseed oil										
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Netherlands	11,285	814	123	1,809	829	227	5	8,668	2,758	2,072	739
United Kingdom	1,440	33	13	1,646	1,234	3	7	2,541	5	36	20
Germany	2,252	10	2	6,318	4	4	2/	2/	1	2/	0
Canada	-	32	34	1	1	1	1	47	1	121	0
Other 5/	64	57	1	187	57	-	12	1	16	3	1
Total 4/	15,041	946	173	9,961	2,125	235	25	11,257	6/ 2,781	6/ 2,232	760

1/ Preliminary.

2/ Less than 500.

3/ Other includes Uruguay, Brazil, China, Mexico, Netherlands, Italy, and France.

4/ General imports, 1926-30; imports for consumption, 1931-36. Total for 1931-33 may not agree with total general imports.

5/ Other includes France, Belgium, Switzerland, Denmark, British India, and Japan.

6/ Includes 14,400 pounds in 1934, and 4,040 pounds in 1935, imported free for supplies of vessels, principally from the Netherlands.

Compiled from Foreign Commerce and Navigation of the United States.

Tung oil

Imports of tung oil into the United States during 1936 were larger than for any previous year, and imports for the first quarter of 1937 exceeded those of any quarter of 1936. See tables 2 and 6. Supplies in China are reported to be more abundant than usual, as the crop harvest in the fall of 1936 is reported by the American Commercial Attache in Shanghai to be 10 percent larger than the good crop of 1935.

In spite of increased imports, consumption during the year decreased by almost 8 million pounds; stocks increased by a similar amount, and are still larger at the end of the first quarter of 1937. During the 6 years for which data have been reported by the Bureau of the Census, tung oil has supplied an average of 17 percent of the total oils used by the drying industries - paint and varnish, linoleum and oilcloth, and printing inks - but consumption in 1936 dropped 2 percent below this average. See table 1. Since tung oil can be stored in the dark for a considerable time without deterioration, large stocks can be accumulated without fear of loss.

Tung oil gives a film, especially noteworthy because of its quick drying toughness and low water permeability, but somewhat lacking in extensibility, and having a tendency to become yellow.

Generally speaking, it is used in paint products to secure drying speed and water resistance, and no other oil gives quite the same degree of these two qualities, but relatively few finishes are subject to continual immersion in water, and good resistance to washing and weather exposure may be secured with other materials.

China has, in the past, been practically the sole producer of tung oil. Many Chinese farmers have regarded the growing of tung trees merely as a side line, and their methods of oil extraction have been very wasteful. It was, therefore, difficult to obtain a standardized or uniform product, but all tung oil now being exported from China must be tested by the Governmental testing laboratories. In other ways, too, methods and policies in China are being altered for the purpose of improving the quality of the tung oil.

By an executive decree of the Chinese Government, May 12, 1936, all production and distribution of vegetable oils, including tung and perilla, were placed under Government control. The corporation was formally inaugurated on August 15, 1936; headquarters are located in Hankow, as is also the main refining plant of the corporation. The corporation, known as the China Vegetable Oil Refinery, Ltd., functions as agent for China's vegetable oil industry, with a view of standardizing and improving production. The corporation also arranges financing, transporting, and marketing facilities for the entire vegetable oil industry and is authorized to manufacture lubricating oils, paints, and varnishes, according to consular reports.

There are no reliable and accurate estimates of production in China. The International Institute of Agriculture at Rome estimated a production of 88 million pounds in 1914, and 227 million pounds in 1929. One estimate places domestic consumption in China in recent years at 93 million pounds. See table 7 for exports and imports by countries. Seventy to 80 percent of the exports from China usually go to the United States, leaving only 20 to 30 percent of the available supply for the use of other countries. During recent years, China has increased the planting of tung oil trees in several new areas.

But, in many parts of the world efforts are being made to develop new production areas of tung oil. For more than 10 years there has been an active interest in the United States in planting of tung trees in the South, and the Census reports the number of trees of all ages has increased from about 350 thousand in 1930 to over 3.5 million in 1935. The nuts ripen in October, about the same time as in China.

Production of oil in the United States, while not officially reported, has been estimated at more than 2 million pounds from the nut crop of 1936, and 300 to 400 thousand pounds from the crop of 1934. There was no nut crop in 1933 or 1935, because of cold weather during the blossoming season. This is a real hazard to the industry. American tung oil is said to be of better quality than any that comes into this country from China.

From feeding tests carried out on rats, poultry, cattle, and pigs. it has been definitely established that tung cake contains certain substances that render it unpalatable to animals, and a substance which has an injurious effect on the mucous membranes of the intestines. It also has strong purgative properties. The cake, therefore, is suitable only for use as fertilizer.

The Argentine Bureau of Statistics reports that a total of 20 thousand pounds of tung oil was produced from domestic nuts in 1935, and that the 1936 output was expected to be considerably larger.

Paraguay estimates plantings of 30 thousand tung trees. Likewise in Brazil, the planting of tung trees seems to be a rapidly growing industry. In 1936 there were estimated to be 500 thousand trees in existence, with at least 450 thousand more scheduled to be planted before the end of 1937.

The Soviet Union is devoting serious attention to the development of the tung industry. Climatic and soil conditions in its Georgia region are somewhat similar to those found in our Gulf Coast States. By 1934, approximately 1,000 acres had been planted. Reports for 1936 estimate plantings of around 7,500 acres, with present plans to increase the plantings to 25,000 acres by 1938. As Russian plantings are so young, only small quantities of oil have thus far been produced, but the oil is claimed to be of satisfactory quality.

In the British Empire experimental work has been carried out under the auspices of the Imperial Institute for several years. Experimental planting in New Zealand was started in 1927, and the acreage now probably amounts to 10,000 acres; they have not as yet harvested a merchantable crop of oil since it has only been 4 or 5 years since plantings were made on a commercial scale. Australia has planted approximately 1,000 acres to tung trees since 1931. Results appear to be satisfactory or promising in Queensland, New Zealand, Rhodesia, and Nyasaland, but less successful or discouraging in some other places.

Planning for future plantings in the United States should be influenced by consideration of plantings in other parts of the world, as well as by considerations of domestic economic factors.

Table 6.- Tung oil: Imports, stocks December 31, and apparent disappearance, averages 1912-29, annual 1930-36

Calendar year	Net imports	Stocks, Dec. 31	Apparent disappearance
	1,000 lb	1,000 lb	1,000 lb
Average			
1912-14	38,381		38,381
1915-19	45,041		45,041
1920-24	66,220	17,549	64,057
1925-29	95,460	24,737	93,710
1930	120,064	49,894	99,581
1931	74,668	33,402	91,160
1932	72,594	30,915	75,081
1933	114,544	41,750	103,709
1934	1/ 110,007	31,495	120,262
1935 2/	120,059	19,008	132,546
1936 2/	134,830	28,872	124,966

1/ Imports for consumption, beginning January 1934.
2/ Preliminary.

Table 7.- Tung oil: Net exports or net imports, by countries, 1930-36

(Net exports are indicated by a minus sign)

Country	1930	1931	1932	1933	1934	1935 1/	1936 1/
	Mil lb	Mil lb	Mil lb	Mil lb	Mil lb	Mil lb	Mil lb
EXPORTING OIL:							
China	-156	-115	-107	-166	-144	-163	-191
IMPORTING OIL:							
United States	126	79	76	119	110	120	135
Germany	13	11	11	14	17	11	12
France	5	3	4	4	3	3	4
Denmark	2	2	2	2	2	2	
Japan 2/	2	1	1	2	2	2	

1/ Preliminary.
2/ Exports not reported, if any.

Compiled from official sources, and from Fehr, Review of Oilseeds, and Oil. . . 1936.

British Malaya, Formosa, and Czechoslovakia report small net imports.

Table 8.- Perilla oil and seed in terms of oil: Net exports or net imports, by countries, 1931-36

(Net exports are indicated by a minus sign)

Description	EXPORTING SEED AND OIL	IMPORTING SEED AND EXPORTING OIL	IMPORTING OIL
	Manchuria	Japan	United States
	Mil. lb.	Mil. lb.	Mil. lb.
1931 -			
Seed in terms of oil	1/ - 19	19	0
Oil	1/ - 8	- 6	13
1932 -			
Seed in terms of oil	- 18	18	0
Oil	- 8	- 8	17
1933 -			
Seed in terms of oil	- 22	22	-
Oil	- 7	- 17	23
1934 -			
Seed in terms of oil	- 26	21	1
Oil	- 7	- 16	25
1935 - 2/			
Seed in terms of oil	3/ - 44	52	1
Oil	3/ - 26	- 47	72
1936 - 2/			
Seed in terms of oil	3/ - 87		1
Oil	3/ - 43		118

1/ Reported as China in 1931.
2/ Preliminary.
3/ January 1 - November 30.

Compiled from official sources.

Table 9.- Perilla seed and oil: Imports, stocks December 31, and apparent disappearance, averages 1913-29, annual 1930-36

Calendar year	Imports for consumption, total oil and oil equivalent of seed 1/	Stocks, Dec. 31	Apparent disappearance
	1,000 lb.	1,000 lb.	1,000 lb.
Average			
1913-14	59		59
1915-19	1,378		1,378
1920-24	3,980		3,980
1925-29	5,272		5,272
1930	8,838	757	8,838
1931	13,286	1,690	12,353
1932	16,525	6,144	12,071
1933	23,068	2,690	26,522
1934	25,971	3,772	24,889
1935 2/	73,358	12,873	64,257
1936 2/	119,288	19,752	112,409

1/ 1922-30, imports of perilla seed are included with sesame seed; 1931-32, no imports of perilla seed reported.

2/ Preliminary.

Perilla oil

Perilla seed is extremely rich in oil, and the oil probably has the most rapid drying properties of any oil now used in the paint and varnish industry.

Upon drying, the oil produces a brilliant, tough, waterproof film, considerably harder than that of linseed oil, and next to linseed and tung oils, perilla has been for the past few years our most important drying oil.

Average annual imports of 5 million pounds, 1925-29, rose to 119 million pounds in the first 9 months of 1936. See table 9. With the imposition of 4-1/2 cents per pound excise tax on the oil and 2 cents per pound on the seed, effectiv August 21, 1936, imports were completely stopped during the last quarter of the year, but 2 million pounds have been imported during the first quarter of 1937. See table 2.

Stocks have been reduced from 39 million pounds on September 30, 1936, to 10 million pounds at the end of March. Now, imports will have to come in over the excise tax or substitutes for the oil will have to be found. It was reported in 1936 that one manufacturing company had formulated a paint using 45 percent soybean oil and 55 percent tung oil.

Experimental plantings of perilla seed have been made in the United States but not on a sufficiently large scale to furnish data on the probable returns to the grower. Production costs are relatively high and in view of the lack of promise of profit, perilla is not recommended for commercial planting at this time. Development of better varieties or methods might change this situation according to a brief mimeographed release by the United States Department of Agriculture in July 1936.

Experiments with perilla are being carried on in the Illinois experimental fields of the State College of Agriculture, and the crop is considered as deserving of further experimentation.

The meal or cake is particularly valuable for fertilizer for mulberry trees and rice, and is so used in Japan. Formerly it was not considered desirable for cattle feed in the United States, but the Bureau of Plant Industry stated in July 1936 that perilla press cake compares favorably with linseed and cottonseed cake as a stock feed, and it has been used for this purpose in California.

Fish oils

The literature on fish oils and their use in the paint and varnish industry shows a great difference in the opinions of the various investigators. While it seems to be generally believed that fish oils (at least so far as our present knowledge goes) are not suitable by themselves to replace linseed oil as a vehicle for ordinary paints, their value for use with other drying oils in special paints has been demonstrated by extensive research in spite of a recognized inferiority with respect to certain properties.

The chief merits of fish-oil films are their flexibility and extensibility. On the other hand, they are somewhat softer, tackier, and less tough than the films of vegetable drying oils. Softness is partly due to the inherent nature of the drying components of the films and is a necessary accompaniment of flexibility; it therefore cannot be considered a total defect.

Sardine, menhaden, and pilchard oils have been used for many years in the manufacture of heat-resistant flexible paints for boiler fronts, smokestacks, and other metal surfaces subject to great expansion and contraction. For this purpose they are said to be superior to other drying oils with the exception of tung oil. They have also been largely used in barn paints. Herring and whale oils are not usually considered good drying oils, although treated whale oil for use in varnishes in place of linseed oil has appeared on foreign markets in recent months. It is too recent to have proven its value to the industry.

In the usual tung oil spar varnish which is used as a medium with aluminum for exterior purposes, the addition of up to 30 percent of a suitable fish oil, like sardine, increases the life and the resistance to heat of the aluminum paint. Kettled fish oils find a large use in the so-called one-coat whites, factory whites, and enamels, and the use in enamels and varnishes is steadily increasing. Oiled fabrics include such materials as used in raincoats, tarpaulin, "American" cloth, table baize, etc. They are manufactured by applying several coats of boiled oil containing suitable pigments and allowing each coat to dry thoroughly. Here again drying fish oils are used extensively with linseed oil in the manufacture of these commodities, the product being more flexible than that from linseed oil alone.

Table 10.-Fish oils: Production, trade, stocks December 31, and apparent disappearance in the United States, averages 1912-29, annual 1930-36

(Net exports are indicated by a minus sign)

Calendar year	Production	Net exports or net imports	Stocks, Dec. 31	Apparent disappearance	Percentage used by drying industry
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	Percent
Average					
1912-14	27,504	- 2,833		25,580	
1915-19	21,012	7,521		28,533	
1920-24	56,651	1,832	29,884	58,976	
1925-29	82,550	27,066	49,636	100,712	
1930	99,009	29,955	125,764	76,220	
1931	64,011	30,925	101,377	119,323	23
1932	85,359	14,677	109,213	92,200	21
1933	128,547	3	110,437	127,326	17
1934	215,870	- 4,144	170,403	151,760	16
1935 1/	228,641	- 2,408	164,216	232,421	19
1936 1/	252,808	- 847	159,485	256,692	20

1/ Preliminary.

Fish oils include: sardine, menhaden, herring, and other fish oils. Various combinations represented in different years. Do not include fish-liver oils.

The 1934 excise tax of 3 cents per pound on fish oil applies only to imported oils, and appears to discourage imports; trade figures show a small net export in 1936 against 15 million pounds net import in 1932, and domestic production of fish oils was about three times as large in 1936 as in 1932. See table 10. The volume used for drying purposes in 1936 was more than double the amount so used in 1932, and the percentage contributed to total use of drying oil jumped from 4 percent to 7 percent in the same period. See table 1. With the technical advances in methods of refining, deodorizing, and wintering fish oils, this trend is likely to continue.

Soybean oil

The actual amount of soybean oil used in paint increased gradually from 1931 to 1935, dropping off slightly in 1936. The percentage contributed by soybean oil to the total drying oils used dropped from an average of 3 percent in 1931-33 to 2 percent in 1934-36. For a discussion of the soybean and soybean oil situation see FOS-2, April 1937.

Table 11.- Soybean oil and soybeans in terms of oil: Net exports or net imports, by countries, 1931-36

(Net exports are indicated by a minus sign)

Country	1931		1932		1933		1934		1935 1/		1936 1/	
	Beans in terms of oil	Oil	Beans in terms of oil	Oil	Beans in terms of oil	Oil	Beans in terms of oil	Oil	Beans in terms of oil	Oil	Beans in terms of oil	Oil
	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.	Mil.lb.
EXPORTING BEANS												
Manchuria 2/	-710	-196	-791	-233	-718	-179	-755	-215	-517	3/-191	-568	3/-134
EXPORTING BEANS AND IMPORTING OIL:												
Chosen	-48	-	-61	-	-50	-	-	-	-	-		
U.S.S.R.	-11	5	-54	5	-2	-	-	0				
United States	-1	-1	-35	-2	-2	2	-	1	-13	10	-16	3
IMPORTING BEANS AND EXPORTING OIL:												
Germany	313	-35	366	-60	361	-68	282	-23	159	31	149	4
Japan	170	-15	145	-14	135	-3	170	-7	162	-11		
Denmark	73	-39	71	-44	72	-37	83	-37	80	-38	75	-34
IMPORTING BEANS AND OIL:												
United Kingdom	35	30	50	4/ 55	49	26	56	4	50	44	26	18
Sweden	10	22	3	27	18	14	29	4	31	4	42	-
Netherlands	10	38	13	25	12	11	40	18	24	3	29	3
France	3	7	4	8	5	8	6	4	7	5	9	3
Italy	12	8	7	8	2	8	6	11	7	5		
Austria	-	6	-	7	-	21	-	22	-	11	-	20
Morocco	-	10	-	16	-	8	-	20	-	-		
Belgium	-	14	-	13	-	14	-	27	-	6	2	11
Norway	-	13	-	14	-	11	-	9	-	8	-	1[illegible]
Canada	-	2	-	2	-	2	-	2	-	2	-	2

Continued -

Table 11.- Soybean oil and soybeans in terms of oil: Net exports or net imports, by countries, 1931-36-Contd

1/ Preliminary.

2/ Reported as China, 1931. Exports of beans in terms of oil include 2 million pounds from China in 1933, and 1 million pounds each in 1934 and 1935.

3/ January 1 - November 30.

4/ For 1932, soybean oil, refined, included with "other sorts" of vegetable oils. Separately reported beginning 1933.

Compiled from official sources.

Occasional trade in soybeans and soybean oil is reported by British South Africa, French Africa, Netherland India, Czechoslovakia, Poland, Formosa, and British Malaya.

Leaders indicate less than half a million pounds, or not reported.

Oiticica oil

The high price of tung oil has led to extensive practical tests of new oils in order to find satisfactory substitutes or oils to use in combination with it. Oiticica oil, from Brazil - it is actually a solid fat, liquified after being imported - is being used by the drying industry in increasing quantities.

The trees grow profusely along the northeastern coast of Brazil and in November produce nuts containing 60 to 65 percent of oil. The potential supply is large, but reliable estimates of the number of trees in Brazil are not available and a large percentage of the trees are in the more inaccessible regions. It is believed that more than 10 million pounds of oiticica oil were produced in Brazil in the 2 years 1934 and 1935. Four million pounds were exported from Brazil in 1935, and 10 million pounds in 1936.

As a whole the results of its use have not been entirely satisfactory, but since it took a good many years to learn to use tung oil properly, the fact that oiticica oil has not been wholly successful during the first 2 or 3 years of its use is not proof that it may not become important in the drying industry. Oiticica oil gives as good a gloss as tung oil but the color is not as satisfactory, and at present clear varnishes made with this oil seem to be somewhat less water-and-alkali resistant than tung oil varnishes.

Some chemists believe that while oiticica oil will surely come into the industry for use in quick-drying finishes, its greatest application may be for special forms of protective coatings. Others believe that it may become of significant importance to the printing ink trade.

Imports in 1936 amounted to about 2 million pounds, and about 1 million pounds have come in during the first quarter of 1937. So far it has been consistently lower in price than tung oil. As there is no excise tax on oiticica oil and it is free of duty its increased use seems probable, with increasing imports during the remainder of 1937.

Hempseed oil

Hempseed oil is a very good drying oil and played a part in replacing tung oil during the period of high prices of tung oil in 1934, 1935 and 1936.

Imports of hempseed into the United States, averaging about 5 million pounds annually from 1929 to 1933, were used almost entirely for purposes other than crushing and therefore did not contribute to the drying oil supplies of the United States. In 1934, hempseed imports jumped to 13 million pounds, in 1935 to 117 million pounds, and during the first 9 months of 1936, 63 million pounds. Oil production, from imported seed, has been privately estimated at 2 million pounds in 1934, and reported as 17 million pounds in 1935, and 13 million pounds in 1936. Imports of the oil always have been negligible, never amounting to more than about 400,000 pounds.

The Revenue Act of 1936 placed an excise tax of 4-1/2 cents per pound on the oil. As a duty of 1-1/2 cents per pound was already effective on the oil the charge became 6 cents per pound. A tax of 2 cents per pound also was placed on the seed which means a charge of almost 8 cents per pound against the average oil yield. The tax appears to have been completely effective in barring imports as none have been reported since August 1936. Stocks of hempseed oil, amounting to more than 8 million pounds at the end of the first quarter of 1936, were reduced to less than a million pounds at the end of the first quarter of 1937. The drying industry cannot therefore expect to augment drying oil supplies with hempseed oil.

Poppy oil

Poppy oil gives a light colored transparent film that is well suited for use in enamels and also for artists' paint. The cold-pressed oil, however, is chiefly used for edible purposes. The press cake is rich in protein and is used as stock feed. Czechoslovakia, Turkey, Hungary, and the Netherlands are the principal poppy seed producing countries, with a production of 8 to 40 million pounds in each annually.

Poppy seed imported into the United States are used for culinary purposes. It is believed that none are crushed in the United States, although in foreign countries considerable amounts of poppy oil are produced. Imports of seed, therefore, are not to be considered as available for oil production. Imports of poppy oil into the United States have been negligible, averaging only about 15 thousand pounds per year in the past 5 years. These imports come chiefly from Germany, with smaller amounts from Netherlands and the United Kingdom.

Safflower oil

Safflower has been grown extensively in India, Egypt, and Turkestan, and to a limited extent in U.S.S.R., but the oil has not entered into international trade to any extent. The crop is being suggested by the Bureau of Plant Industry as a new dry land and irrigation crop for the Northern Great Plains, and experimental plantings are being made. The oil is especially useful in the manufacture of white paints and white enamels, as it does not yellow. It dries as quickly and a hard as linseed oil. Limited feeding tests with press cake indicate that it possesses value as a feed for dairy cattle, sheep, and poultry.

Rape oil

Rape oil does not affect the drying oil picture as it is not a satisfactory drying oil and is used by the drying industry only in negligible amounts in mixtures with other oils for certain purposes.

Sesame and sunflower oils

It is possible that some sesame oil is used in the drying industry, but none has been reported. Reports show that 3 million pounds of sunflower oil were used in the drying industry in 1934, 97 thousand pounds in 1936, and none reported in other years.

Castor oil

Castor oil is a nondrying oil, but by a novel treatment, synourine oil (also called Scheiber oil from its inventor) is obtained from castor oil by splitting off water. This reaction results in the introduction of two conjugated double linkages yielding an oil intermediate between linseed oil and tung oil. This oil is reported as being manufactured commercially in Germany, although the cost of production is very high. On account of its peculiar tung-like structure the oil yields a glossy water-proof film.

Census reports show consumption of castor oil by the drying industry as 2 million, 3 million, 4 million, and 5 million pounds in 1933, 1934, 1935, and 1936 respectively.

Table 12.- Drying oils: Excise taxes imposed by the Revenue Acts of 1934 and 1936, effective on and after Aug. 21, 1936, and tariff rates established by Tariff Act of 1930, as amended by Presidential proclamations and by Trade Agreements to May 1937

Fat or oil 1/	Duty 2/	Excise tax on imports into United States 3/
Drying -		
Hempseed oil	1½c per lb.	4½c
Linseed oil	4½c " "	–
Perilla oil	Free	4½c
Hempseed	Free	2c
Flaxseed	65c per bu. of 56 lb.	–
Perilla seed	Free	2c
Citicica oil	Free	–
Poppy oil	2c per lb.	–
Rubberseed oil	4/	–
Safflower oil	4/	–
Soybean oil	3½c per lb. but not less than 45% ad val.	–
Tung oil	Free	–
Walnut oil	4/	–
Poppy seed	5/ 16c per 100 lb.	–
Rubber seed	4/	–
Soybeans	2c per lb.	–
Tung nuts	Free	–
Semi-drying 6/		
Rape oil -		
rendered unfit for food	Free	4½c
other	6c per gal.	"
Sesame oil -		
rendered unfit for food	Free	"
other	3c per lb.	–
Sunflower oil -		
rendered unfit for food	Free	4½c
other	20% ad valorem	"
Rapeseed	Free	2c
Sesame seed	Free	"
Sunflower seed	2c per lb.	–
Seeds and nuts n.s.p.f. (when oils derived therefrom are free)	Free	–
All other expressed or extracted vegetable oils n.s.p.f.	20% ad valorem	–
Nut oil n.s.p.f.	Free	–

Continued -

Table 12.- Drying oils: Excise taxes imposed by the Revenue Acts of 1934 and 1936, effective on and after Aug. 21, 1936, and tariff rates established by Tariff Act of 1930, as amended by Presidential proclamations and by Trade Agreements to May 1937 - Continued

Fat or oil 1/	Duty 2/	Excise tax on imports into United States 3/
Marine animal oils -		
Herring and menhaden oils . .	5c per gal.	7/ 3c
Whale oil	6c " "	7/ "
All other fish and marine animal oils n.s.p.f. . . .	20% ad valorem	7/ "

1/ Whether or not refined, sulphonated, sulphated, hydrogenated, or otherwise processed.

2/ Drying oils entering continental United States from "possessions" of the United States are free of duty.

3/ In this case "United States" means the States, the Territories Alaska and Hawaii, and the District of Columbia (according to Sec. 1111 (a) (10), Revenue Act of 1932, and Sec. 801 (a) (10), Revenue Act of 1934).

4/ If ruled to be "vegetable oils" n.s.p.f., a tariff rate of 20% ad valorem, if "nut oils" n.s.p.f., free of duty.

5/ Reduced from 32 cents per 100 pounds. Netherlands Trade Agreement, Feb. 1, 1936.

6/ The division between non-drying, semi-drying, and drying oils is not clearcut: In general, a fat or oil having an iodine number less than 100 is classed as non-drying; one having an iodine number between 100 and 130 as semi-drying; one with a number above 130 is put in the drying class. The best known semi-drying oils are corn oil, cottonseed oil, rape, sesame, and sunflower oils.

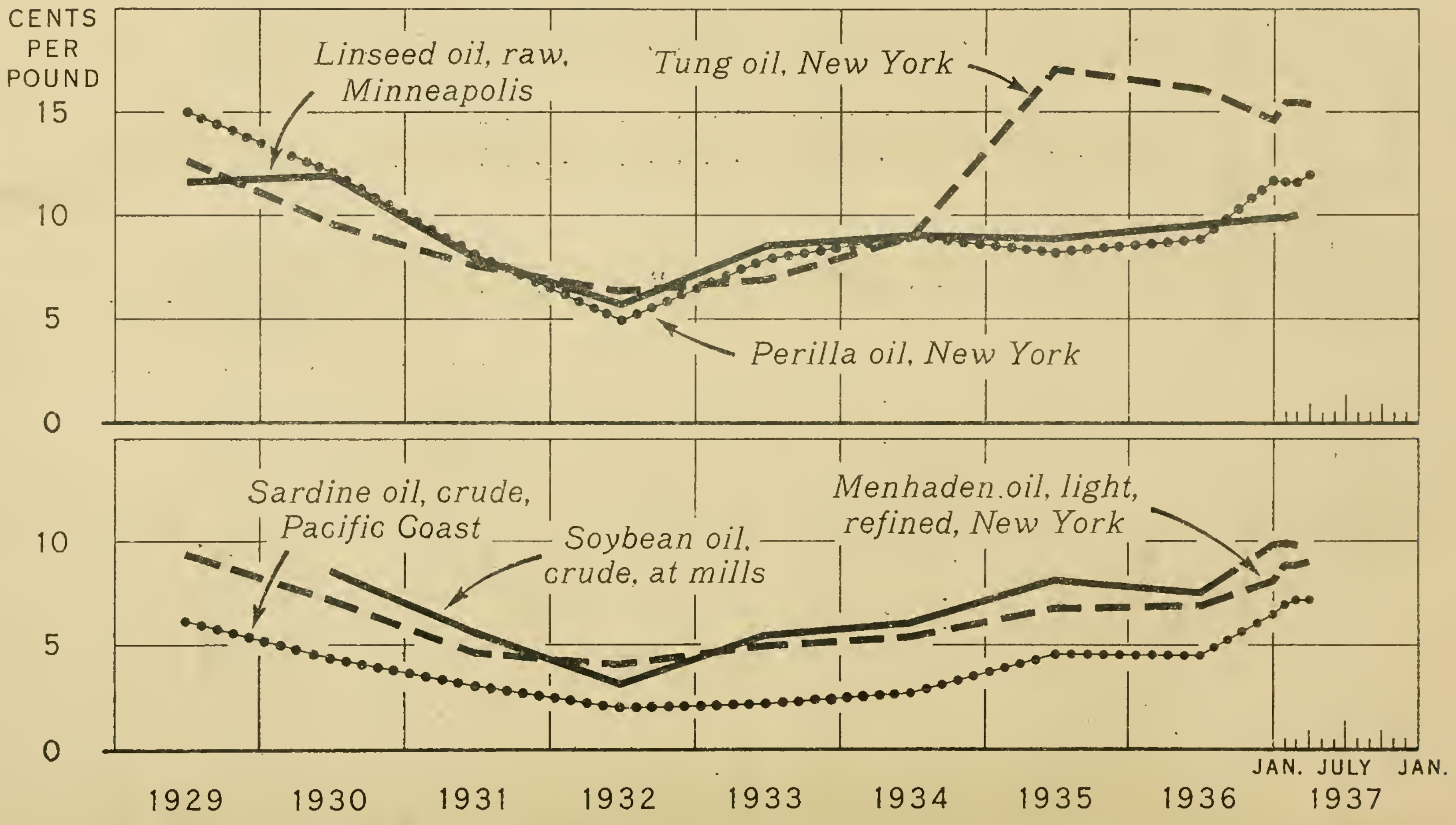
7/ Does not apply to product of American fisheries.

Table 13.- Price per pound of selected fats and oils, March and April, 1936 and 1937

Fat or oil	1936		1937	
	Mar.	Apr.	Mar.	Apr.
	Cents	Cents	Cents	Cents
Butter, 92°, New York	32.2	31.0	35.8	32.9
Oleomargarine, nut, Chicago	11.5	11.7	14.4	14.0
Lard, prime steam, Chicago	10.8	11.0	12.5	11.6
Lard refined, Chicago	11.9	11.9	13.2	12.6
Lard compounds, Chicago	11.9	11.8	13.7	13.7
Coconut oil, edible, New York	6.8	6.7	11.0	10.5
Cottonseed oil, crude, f.o.b. S. E. mills	8.3	8.4	9.9	9.5n
Cottonseed oil, p.s.y., New York	9.4	9.4	11.1	
Soybean oil, refined, New York	9.6	9.2	12.2	12.4
Peanut oil, domestic, refined, N. Y.	12.4	12.4	13.5n	13.5n
Rape oil, refined, New York	7.0	7.2	11.7	12.2
Oleo oil, No. 1, New York	11.5	11.0	13.4	13.1
Oleostearine, barrels, New York	7.9	8.1	10.3	10.2
Corn oil, refined, New York	11.0	11.1	13.0	12.9
Olive oil, edible, New York	22.8	22.7	33.3n	33.3n
Sesame oil, refined, New York	10.4	10.2	10.1n	10.0n
Sunflower oil, refined, New York	10.3	9.9	12.2n	12.2n
Teaseed oil, edible, New York	9.1n	8.8	14.0n	10.5
Coconut oil, crude, Pacific Coast	4.2	4.2	8.6n	7.9
Tallow, inedible, Chicago	5.0	4.8	8.9	8.6
Grease, house, New York	4.5	4.8	8.8	8.7
Palm oil, crude, New York	4.7	4.6	6.6	7.0
Olive oil foots, barrels, New York	8.2	8.1	12.0n	11.6n
Palm-kernel oil, denatured, New York	4.7n	4.9n	7.4	7.1
Babassu oil, tanks, NewYork 1/	7.0n	7.0	11.4	10.8
Sardine oil, tanks, Pacific Coast	4.4n	4.2n	7.2	7.2
Linseed oil, raw, Minneapolis	9.3	9.2	10.0	10.8
Tung oil, drums, New York	16.9	19.2	15.4	15.3
Perilla oil, drums, New York	7.3	7.4	11.6	11.9
Soybean oil, crude, f.o.b. mills	6.8	6.8	9.8	9.8
Menhaden oil, crude, f.o.b. Balto.	4.6n	4.5n	5.7	6.0
Hempseed oil, crude, New York	8.4	8.4	-	-
Castor oil, No. 3, New York	10.2	10.2	10.2	10.2
Cod oil, barrels, Newfoundland	5.3n	5.3n	6.8n	6.9n

1/ Beginning March 1937, prices are futures.

PRICES OF DRYING OILS, 1929 TO DATE



U. S. DEPARTMENT OF AGRICULTURE NEG. 32373 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 1

OLEOMARGARINE

Total production of oleomargarine in the frist quarter of 1937 was about 12 percent lower than in the same period a year ago, although March 1937 showed a 7 million-pound increase over February.

The increased volume of oils needed for manufacture in March was supplied by cottonseed, babassu, and soybean oils. Use of coconut oil in oleomargarine has continued to show a steady decline month by month, dropping from 11 million pounds in December 1936 to 5 million pounds in March 1937.

Table 14.- Oleomargarine: Materials used in manufacture, United States, February and March, 1936 and 1937

Item	1936 1/		1937 1/	
	Feb.	Mar.	Feb.	Mar.
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Oleo oil	1,540	1,270	1,363	1,558
Lard, neutral	292	208	173	182
Oleostearine	247	278	225	238
Oleo stock	174	194	131	160
Cottonseed oil	10,700	8,818	12,848	14,644
Peanut oil	560	401	234	321
Soybean oil	348	290	2,283	3,863
Corn oil	5	99	175	148
Coconut oil	17,108	13,289	5,913	5,197
Babassu oil	976	2,856	258	2,354
Palm oil	106	177	191	214
Palm-kernel oil	27	-	83	960
Sunflower oil	4	-	-	-
Sesame oil	6	9	-	-
Total fats and oils	32,093	27,889	23,877	29,839
Milk	7,555	6,622	5,197	6,774
Other miscellaneous	2,123	1,873	1,345	1,631
Grand total	41,771	36,384	30,419	38,244

1/ Preliminary.

Compiled and computed from reports of the Commissioner of Internal Revenue.

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